

What is claimed is:

1. A tool path data generation apparatus for automatically generating tool path data including position data to transfer a tool and cutting conditions etc. of a tool in an NC machine tool, the tool path data generation apparatus comprising:

a feature data extractor to extract at least features in relation to a three-dimensional shape of a workpiece on the basis of geometry data thereof created with using CAD,

a tool/cutting data storage to store data such as a cutting mode and tool information in accordance with feature shape, a cutting speed and a depth of the cut in accordance with workpiece material, etc. ,

a cutting method setting unit to set an optimal cutting method for each feature shape on the basis of feature data extracted by the feature data extractor and data stored in the tool/cutting data storage, and

a tool path data generator to generate tool path data on the basis of the cutting method set by the cutting method setting unit.

2. The tool path data generation apparatus as claimed in claim 1, wherein the cutting method setting unit divides a machining area for each feature shape on the basis of the feature data extracted by the feature

data extractor and sets the cutting method for each divided machining area,

the tool path data generator generating tool path data every machining area on the basis of the cutting method set by the cutting method setting unit.

3. The tool path data generation apparatus as claimed in claim 1 further comprising an information generator related to cutting to generate information related to cutting such as a consumption amount of a tool, an estimated period taken for an abrasion of the tool, an estimated period taken for a cutting etc. on the basis of the cutting method set by the cutting method setting unit as well as information stored in the tool/cutting data storage.

4. The tool path data generation apparatus as claimed in claim 3 further comprising a cutting scenario output unit to output the cutting method set by the cutting method setting unit and/or information related to cutting generated by the information generator related to cutting.

5. The tool path data generation apparatus as claimed in claim 1 further comprising:

an NC cutting program generator to generate an NC cutting program on the basis of tool path data generated by the tool path data generator, and

a program output unit to output the NC cutting program generated by the NC cutting program generator.

6. The tool path data generation apparatus as claimed in claim 1 further comprising:

a motion data generator to generate motion data to drive a servo mechanism of the NC machine tool on the basis of tool path data generated by the tool path data generator, and

a motion data output unit to output the motion data generated by the motion data generator.

7. A numerical controller to control an operation of the NC machine tool on the basis of tool path data including position data to transfer a tool and the cutting conditions etc. of the tool, the numerical controller comprising:

a tool path data generator as claimed in any of claims 1 to 6, and

an executing unit to execute processes in order on the basis of tool path data generated by the tool path data generator so as to control the operation of the NC machine tool.

8. A numerical controller to control the operation of the NC machine tool on the basis of tool path data including position data to transfer a tool and cutting conditions etc. of the tool, the numerical controller

comprising:

a tool path data generation apparatus as claimed in claim 4,

a cutting scenario storage to store the cutting method set by the cutting method setting unit and information related to cutting generated by the information generator related to cutting,

an executing unit to execute processes in order on the basis of tool path data generated by the tool path data generator, wherein the executing unit temporarily stops the processes when receiving interruption signals, while re-starts the processes when receiving resuming signals for controlling the operation of the NC machine tool, and

a cutting scenario rewriting unit to rewrite the cutting method and/or information related to cutting stored in the cutting scenario storage.

9. The numerical controller as claimed in claim 8 further comprising a tool/cutting data updating unit to update data stored in the tool/cutting data storage by referring to data stored in the cutting scenario storage which has been rewritten by the cutting scenario rewriting unit.

10. The numerical controller as claimed in claim 9 further comprising a database output unit to output data

stored in the tool/cutting data storage.